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POLICY AND INFORMATION NOTICE 05-2

Subj: CRITICAL OPERATIONAL ISSUE (COI) RISK ASSESSMENT REPORTING METHODOLOGY

Ref: (a) COMOPTEVFORINST 3960.1H

Encl: (1) COTF Standardized Risk Assessments

1. Purpose. This notice provides the methodology to be used for reporting risk assessments in Early Operational Assessment (EOA) and Operational Assessment (OA) reports.

2. Background. All EOA and OA test periods provide a risk assessment of the system under test. This is accomplished by assessing the level of risk of each COI as projected to obtaining a satisfactory determination at Initial Operational Test and Evaluation (IOT&E). Previously, a single assessment of high (red), medium (yellow) or low (green) risk for each COI has been reported without any standardized method for differentiation between each risk level.

3. Guidance. All EOA and OA reports will follow the standardized risk assessment methodology provided in enclosure (1).

4. Implementation. This policy is effective immediately and shall be used for all EOA and OA reports published after 15 January 2006. This methodology shall be reviewed in 6 months to incorporate lessons learned from its initial utilization.

5. This PIN will be incorporated into the upcoming revision of reference (a).

W. J. MCCARTHY
Rear Admiral, U.S. Navy

Distribution: (COMOPTEVFORINST 5216.2P)
List I
List III

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COTF Standardized Risk Assessments

1. General Risk Discussion

a. EOA and OA reports are based not only on the "here and now" but also on what is anticipated to occur prior to Initial Operational Test & Evaluation (IOT&E) or Follow-On Operational Test & Evaluation (FOT&E). At completion of data analysis, OTDs and OTCs have made simple red, yellow, green assessments regarding specific risk areas. In some cases, these assessments were based solely upon the impact of the issue with little or no insight into its likelihood of occurrence, potential workarounds, or mitigation. To inform decision makers on OPTEVFOR's assessment of program risk, a thorough risk assessment should be based on all of these factors. To that end, the 5 x 5 consequence versus likelihood risk matrix depicted in figure 1 shall be used as the basis for all risk assessments. This risk matrix is based upon the Navy's standard risk determination strategy adapted to the operational test environment.

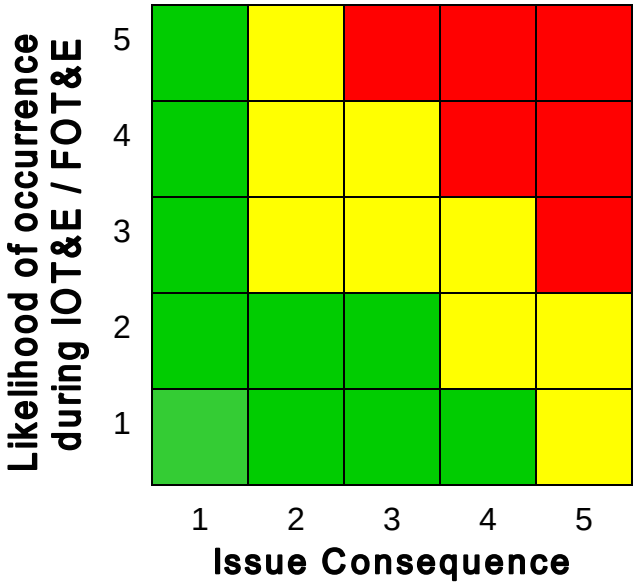


Figure 1. 5 x 5 Risk Matrix

b. The level or degree of risk is based upon the consequence of the issue and the likelihood of its occurrence during IOT&E or FOT&E. Consequence is a relatively clear cut determination. To some degree the issue identified/discovered will impact task execution, and, inherently, the level of mission accomplishment.

c. Likelihood, on the other hand, is somewhat less predictive since it is the dependent variable in the risk model. In general, the OTD must have some knowledge of the variables that drive the likelihood prediction, for example:

(1) Technical challenges to achieve required/desired performance

(2) Time available to correct/mitigate issues prior to IOT&E

(3) Funding available to correct/mitigate issues prior to IOT&E

d. Often the OTD will not have the expertise to make a risk assessment without some assistance. In order to make a technical, schedule, or cost risk assessment, the OTD will first need to thoroughly understand the issue and determine the program manager's (PM) plans for correction and mitigation. This should lead to the development of questions to ask of appropriate subject matter experts (SME) to better understand the risk. In some cases, these SMEs may be program office (or even contractor) personnel. That is not to say the OTD should merely parrot the PM team's assessment, but, rather use SME technical/programmatic knowledge combined with operational judgment to arrive at an independent conclusion. SMEs might include software and systems engineers, logisticians, budget analysts, risk management experts, academia, or fleet operators.

e. While not an all-encompassing list, some of the questions that might be asked include:

- Does the proposed change impact other critical functions?
- Is there a version of software documented for the proposed change?
- What is the developer's track record with making these types of changes?
- Are there metrics that might give insight into the program's track record regarding corrections?
- What is the "industry standard" for making these types of changes?
- How much developmental regression testing is being proposed?
- Are there suitability impacts as a result of the change?
- Does the change involve both hardware and software?
- How much time is realistically needed to design and implement the change?
- Is the proposed solution technologically feasible?
- Where is the program in the development cycle?
- How much time is available prior to IOT&E?
- How expensive is the proposed change as compared to the overall program budget?
- Is there sufficient cost reserve to make the change?

2. <u>The 5 x 5 Risk Matrix</u>. Armed with the general information above, the OTD can use the 5 x 5 matrix to assess a wide variety of program risks. In order to use this tool, some basic definition of the axes is required.

a. <u>Issue Consequence Axis</u>. The consequence axis has historically been the dominant axis used to provide COI color coding with minimal importance placed on likelihood of occurrence projected to IOT&E (or FOT&E). In the 5 x 5 risk matrix, this axis is only one part of the equation that provides a relative scale regarding the impact of the issue on the mission/COI based upon factors, including: the frequency of occurrence, mission conditions when the issue was discovered, feasibility of workarounds, operator compensation required, etc. As issues (or

potential issues) that impact mission accomplishment are identified, they should first be classified based on the definitions in table 1. (It should be noted that for an IOT&E, SQT, or FOT&E, this would form the entire issue classification.)

Table 1. Mission / COI Impact Classification

EOA / OA Mission Impact Level	Descriptor	Issue Definition
1	Minimal	Annoying system characteristic or nuisance which does not degrade operational/mission performance or suitability
2	Minor	Issue which degrades (but does not prevent) operational/mission performance or suitability but can be overcome with operator compensation/workaround
3	Moderate	Issue which degrades (but does not prevent) operational/mission performance or suitability, no acceptable operator compensation/ workarounds exists
4	Significant	Issue that prevents operational/mission performance or suitability, but can be overcome with operator compensation/workaround
5	Severe	Issue that prevents operational/mission performance, cannot meet mission objectives or suitability threshold, no workarounds available

b. Issue Likelihood of Occurrence at IOT&E/FOT&E. Once consequence has been classified, the next step is to determine the likelihood of occurrence at IOT&E/FOT&E. The likelihood of occurrence focuses on the probability that the issue will exist at the time IOT&E/FOT&E commences, factoring in the current and expected level of maturity, as well as any potential mitigation plans by the program as previously described. Table 2 provides basic guidance with regard to the scaling.

Table 2. Likelihood of Occurrence at IOT&E / FOT&E

		OTD's Estimate of likelihood of issue occurrence at IOT&E/FOT&E given the program's demonstrated maturity rate to date:	**Program Office Estimate of Impact to:**	
Level	**Descriptor**		**Future Schedule**	**Future Cost**
1	Negligible	One can reasonably assume no occurrence, and any correction should not be technically challenging within the current schedule prior to IOT&E.	Minimal or no impact	Minimal or no impact
2	Unlikely	Issue is possible but less than likely (10 – 40%) and should be easily corrected / mitigated prior to IOT&E AND program plans are currently in place to address it.	Additional program activities required, able to meet key dates	Program funding sufficient as allocated to correct issue
3	Likely	Issue has a significant chance of occurrence (40 – 65%) and may be corrected / mitigated prior to IOT&E AND program plans are not currently in place to address it.	Minor schedule slip, no impact on key milestones	Program funding adequate but reallocation necessary to correct issue
4	Highly Probable	Issue has a very high chance of occurrence (65 – 90%) and is deemed to be difficult to correct / mitigate prior to IOT&E.	Program critical path affected, impact to key milestones	Program funding not adequate
5	Near Certainty	Anticipate issue to occur (>90%) and is deemed nearly impossible to correct / mitigate prior to IOT&E unless substantial changes to the program are made.	Cannot meet key program milestones	

The percentages are not meant to drive a mathematical computation of the likelihood of occurrence. Instead, they are merely a means to help the OTD assess the qualitative estimate of the likelihood of that issue occurring at IOT&E/FOT&E.

3. Definitions. The previous tables are meant to be intuitive. Nevertheless, the definitions below are intended to clarify some of the "finer points":

a. Degraded operational performance/mission – The system's operational performance/mission is less than optimal because:

- performance or quality of result is less than required or expected, or,
- time required to accomplish task is longer than required or expected.

b. Degraded operational suitability – The system's suitability is less than optimal because:

- Supporting characteristics of the system detract from the ability to place the system in use and sustain it under operational conditions.

c. Prevented operational performance/mission – The system's operational performance/mission is unsatisfactory because:

- Performance or quality of result is unsatisfactory to achieve a militarily useful operational capability for the system under test.

d. Prevented operational suitability – The system's suitability is unsatisfactory because:

- Supporting characteristics of the system prevent the system from being placed in use and/or sustained under operational conditions without unsatisfactory impacts to employment strategy, concepts of operation, or effectiveness.

e. "Can be overcome with operator compensation/workaround**"** – the particular issue can be resolved with additional training and/or experience such that the operator knows to do something (or not do something) that is otherwise not part of the normal training syllabus (operator compensation) or the operator solves the issue by taking some alternative course of action to accomplish the same end result (workaround). To be acceptable, it must be an action, or series of actions, that can reasonably be accomplished by an average fleet user without excessive impact to other capabilities. It is important to note that both operator compensation and workarounds can be engineered into the training for system operators.

f. Once the magnitude for both axes has been decided, the matrix is used to determine the impact of the issue. Figure 2 is an example of an issue that has been determined to have a operational performance/mission impact of 4 and a likelihood of 3. The result yields a yellow (or moderate) assessment for the issue.

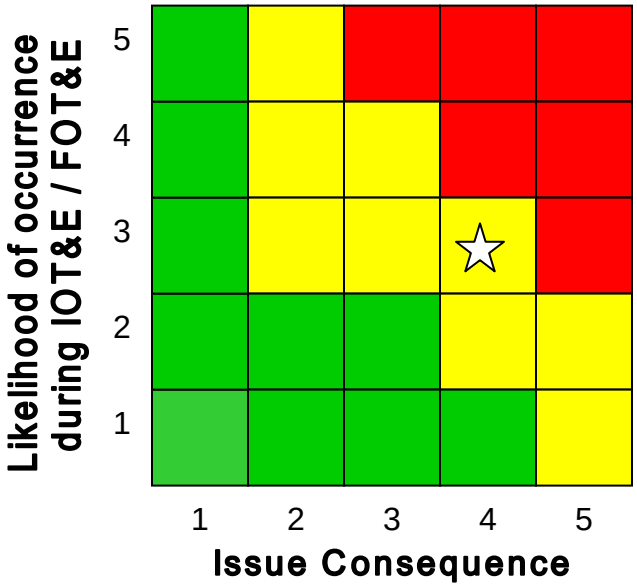


Figure 2. Sample 5 X 5 Risk Matrix

4. Overall COI Assessment

a. The system under test's report enclosure shall present a single 5 x 5 risk matrix for each COI, plotting each operational/mission performance or suitability issue. The overall risk attributed to a COI will be the greatest or highest risk individually attributed to an issue within the COI. The greatest or highest risk level presented in terms of a color code is:

- high – red
- moderate – yellow
- low - green

For example, a COI that has several issues assessed and the greatest/highest single issue assessed is high risk (red) will result in the overall COI being assessed as high risk (red).

b. In those cases where there are too many issues to be plotted on one matrix, the alternative is to list the issues in table form with a column for operational performance/mission/COI impact, a column for likelihood, and a column for issue assessment. This would result in a table similar to table 3 (page 7). The system under test's executive summary COI table shall present the overall color coded risk assessment for each COI (as done for current reports). Report examples 1 (risk matrix) and 2 (alternative table form) are shown on the following pages.

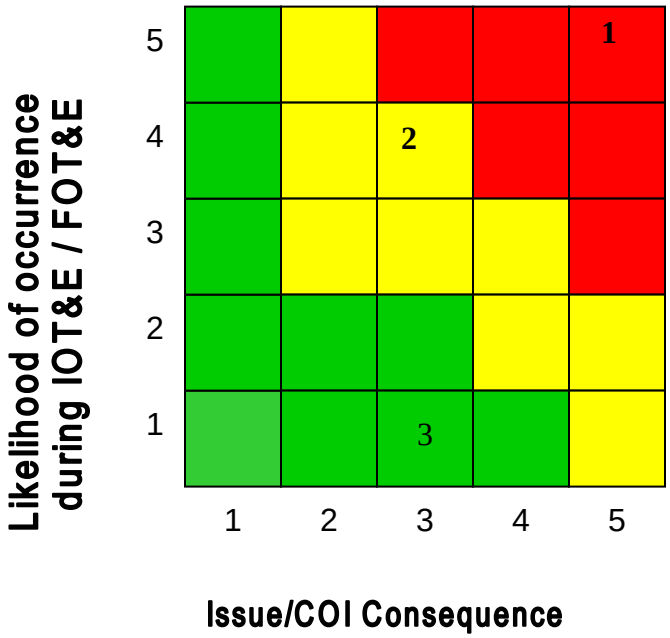
Example 1, Risk Matrix Assessment

3. TEST E-1 - SHIP'S SELF-DEFENSE

- Will System X effectively defend the ship against threat aircraft and antiship cruise missiles?

3.1 Results (Red) *[The overall COI risk assessment shall be the highest performance/ mission or suitability issue risk level presented in terms of a color code (red, yellow, or green)]*

System X was assessed as high risk in a number of important areas. System X design and testing completed to date has not demonstrated that the self-defense capabilities will be sufficient to meet the requirements/capabilities.



3.2 Areas of Risk *Each issue shall be listed in order of highest assessed risk to lowest.*

1. Issue #1 Description (5 x 5) *Provide a description of the performance/mission issue.*

- **Operational Performance/Mission Consequence Assessment.** *Provide rationale for the consequence assessment level.*
- **Likelihood Assessment.** *Provide rationale for the likelihood assessment.*

2. Issue #2 Description (3 x 4) *Provide a description of the performance/mission issue.*

- **Operational Performance/Mission Consequence Assessment.** *Provide rationale for the consequence assessment level.*
- **Likelihood Assessment.** *Provide rationale for the likelihood assessment.*

3. Issue #3 Description (3 x 1). *Provide a description of the performance/mission issue.*

- **Operational Performance/Mission Consequence Assessment.** *Provide rationale for the consequence assessment level.*

- **Likelihood Assessment.** *Provide rationale for the likelihood assessment.*

Example 2, Risk Assessment Summary

Table 3. COI Occurrence/Consequence			
Issue	**Operational Performance/ Mission/COI Impact**	**Likelihood**	**Issue Assessment**
Issue #1 Description	5	5	**Red**
Issue #2 Description	3	4	**Yellow**
Issue #3 Description	3	1	**Green**
Overall COI Assessment			**Red**

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